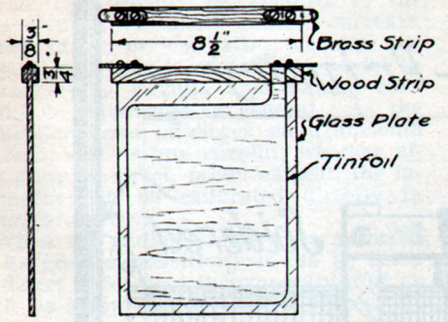
High Tension Condensers

By Curtis Kissel

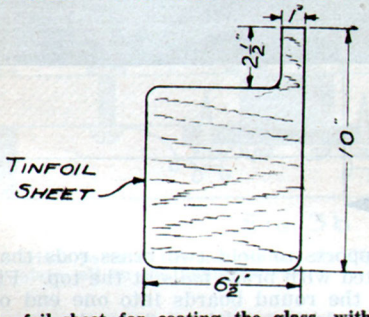
MANY Tesla and Oudin coils which are mechanically and electrically correct will not always develop the efficiency or rating expected of them by the constructor.



Construction of one of the plates of the glass condenser, showing its mounting and coating of tin foil.

The writer found that the difficulty was rather with the spark gap and condenser than with the coil proper. The spark gap was fitted with double silver sparking points, delicately adjustable, and, with the condenser described below, discarded coils taken out of storage operated splendidly, giving a flaming ten-inch spark.

The condenser is made of 8 × 10 inch photographic plates. Twelve plates are used and the gelatine coating or film is removed with hot water. After every trace is taken off the plates are further cleaned with clear water and Dutch Cleanser,

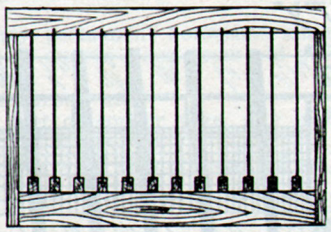


Tin foil sheet for coating the glass, with lug to complete the connection.

wiped with a clean rag and held near the fire to complete the drying.

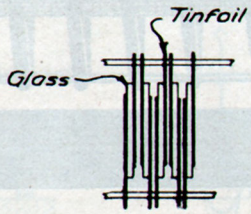
Wooden sticks 8½ inches long, ¾ inch wide and ⅜ inch thick come next. They may be made of straight grained pine or poplar. The sticks are placed in a vise and a groove cut lengthwise on the ⅜th edge with a rip saw to a depth of about a quarter of an inch. The groove may be widened a little if necessary by running a thin piece of broken glass through it so as to scrape off the sides. The glass plates must fit freely in these grooves or they may be strained and break.

Twelve sticks are thus prepared and are boiled in paraffin, and when the sticks after removal from the melted paraffin have become cool, the plates are to be fastened into them. A temporary fitting rack is shown in Fig. 2, which is self-explanatory. The grooves in the upper bar are spaced about 1½ inches apart. The groove in one of the sticks is now filled with rather thick shellac varnish and one of the plates is pressed into it, the 8 inch wide side being used. The plate is worked back and forth a little so as to



Mounting glass plates in their supporting strips. The strips are at the bottom while the cement is setting.

get it well seated; the wood should project one quarter inch from each side. The surplus shellac is wiped away while it is still liquid. The other plates are also

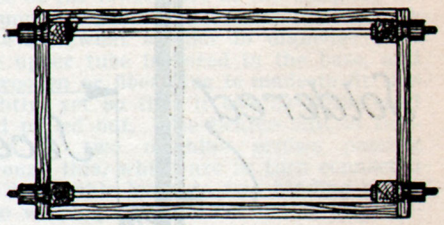


Cross-sectional view of condenser and plates.

shellacked into their respective sticks and are left standing in the frame for forty-eight hours. Any surplus shellac which is now dry is scraped off and the stick is sandpapered smooth.

The tin foil for the coating should run about 1600 square inches to the pound and be of the best quality. One pound will cover both sides of the twelve plates. The writer has tried shellac, banana oil, varnish, and glue for attaching the tin foil, and found that LePage's glue is about the best. The tin foil is cut into sheets 10 x 6½ inches, two for each plate. There is a lug on each of them and the corners are rounded.

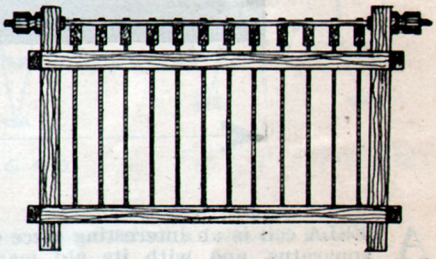
A plate is placed on a level board, the glue is spread over its surface with the addition of water, and is worked all over the surface with the fingers. One of the tin foil sheets is placed on this, allowing a three-quarter inch margin on three sides; at the top there is a 1½ inch margin. Keeping the fingers wet, smooth down the foil. It is now rolled with a wet photographer's print roller squeezing out surplus glue and water and air bubbles. The rolling should be done from the center of the foil towards the edges. The connecting tin foil lug is also glued nicely to the glass and its end is carried around the stick on top of the



Top of the case with supporting rods for carrying the coated plates.

pane. The plate is wiped up with a wet sponge and put aside to dry. It will be understood that in coating the two sides the lugs are set one to the left and one to the right.

Brass strips are screwed down to each end of the sticks, the inner end covering the tin foil lugs. They are secured with wood screws; the screws are covered with glue before being screwed down. The wood strips are now shellacked and when dry are painted with black enamel paint, only, however, for appearances' sake. The corners of the tin foil being rounded, tends to prevent brush discharge from the corners. Now the plates are coated with a thin coat of resin or resin and beeswax mixed, two parts of resin and one wax, which is applied by dipping into the hot



Complete mounting of condenser shown in its final frame.

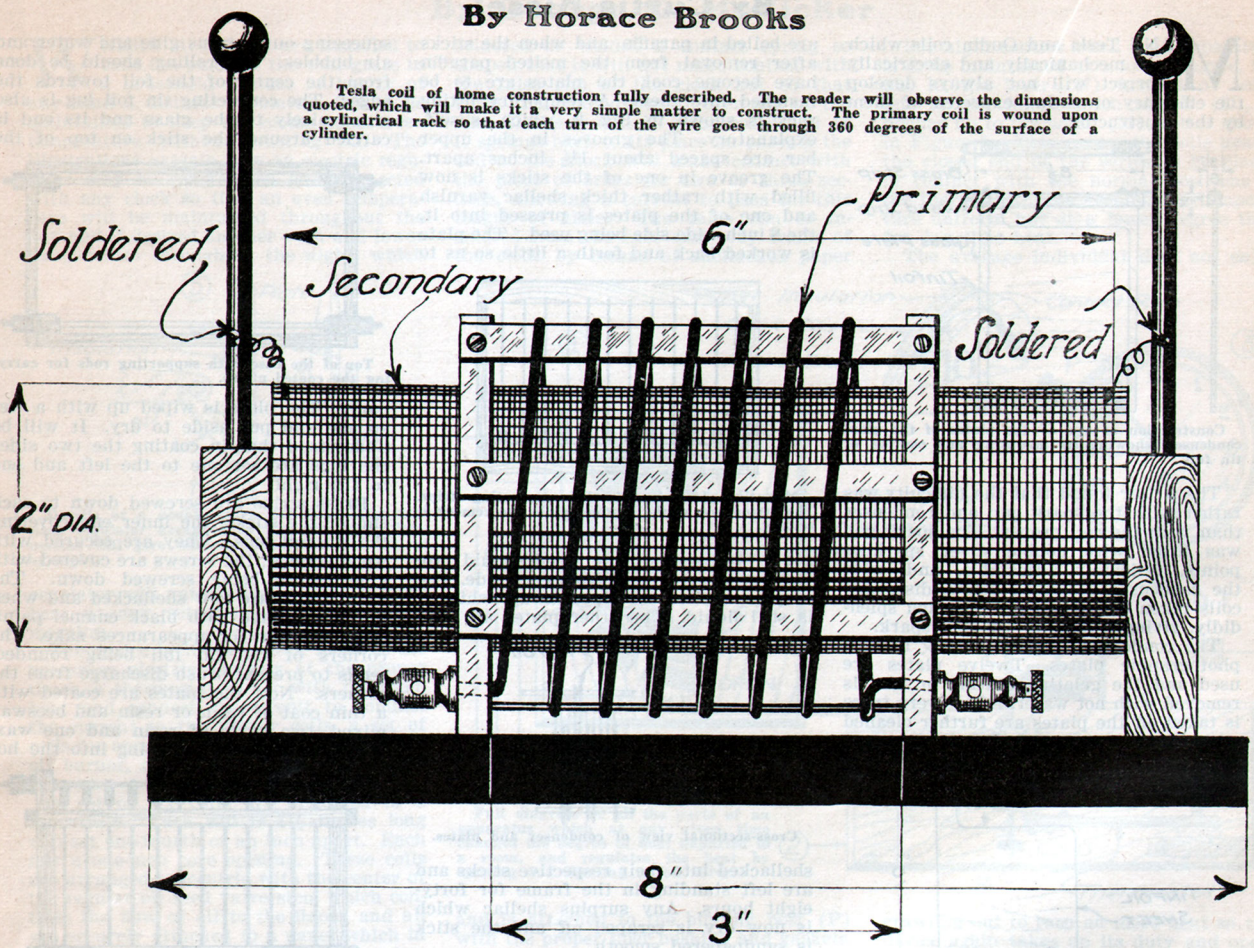
mixture. The plates are first heated, then lowered into the tank with an even motion, and then quickly withdrawn with the same uniform motion and with the same speed. There must be no stop and no jerky motion.

Figure 4 shows the rack for holding the plates of the finished condenser. It will be observed that the rods on which the brass strips on the tops and ends of the sticks rest, take care, one of one set of plates and the other of another. The rods should be one-quarter inch round brass and threaded for the nuts. Porcelain bushings should be used in the uprights for the rods to go through, and the plates are to be spaced one inch apart.

Tesla Coil

By Horace Brooks

Tesla coil of home construction fully described. The reader will observe the dimensions quoted, which will make it a very simple matter to construct. The primary coil is wound upon a cylindrical rack so that each turn of the wire goes through 360 degrees of the surface of a cylinder.



A TESLA coil is an interesting piece of apparatus, and with its aid many wonderful experiments can be performed. The apparatus shown here is a rather small one, but will give good results with a one-inch spark coil.

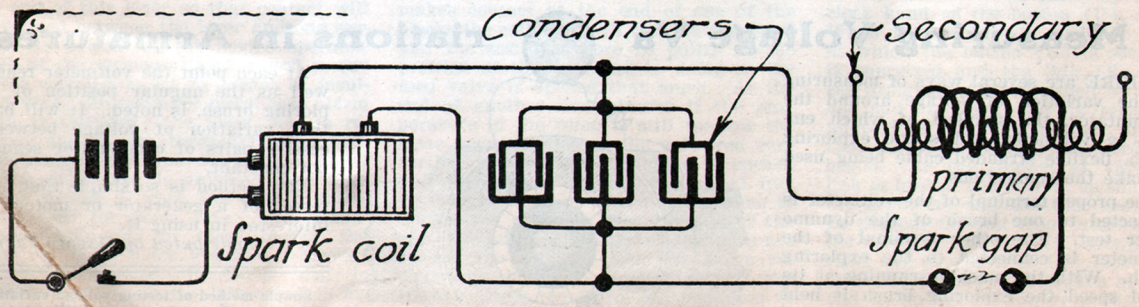
First cut a half-inch board about 8 by 3 inches. Give this a good coat or two of shellac or varnish.

The primary is composed of seven turns of No. 14 copper wire wound around two wooden drums that have an inside diameter of three inches. The drums are held together by eight strips of wood 3½ inches long and are one-quarter of an inch wide. With small brass screws, screw these eight strips of wood at equal distances along the outside edges of the drums, allowing one-quarter inch on each end for screwing. Wind on the seven turns of No. 14 wire in a sort of slant, as shown in the illustration. Grooves may be cut in the strips for the wire. Fasten the ends of the wire to binding posts. Then screw the whole primary to the base.

The secondary is wound on a tube six inches long and two inches in diameter. Start a fraction of an inch from the end of the tube and wind on a smooth, even layer of No. 24 copper insulated wire. Leave a few inches of wire on each end for connections. Then saw out two round pieces of wood just large enough to fit snugly in the tube. These are screwed with brass screws, to two hard rubber uprights or supports. If hard rubber is not obtainable, wood boiled for a few minutes in paraffin will answer the purpose fairly well.

Then bore two holes in the top of the supports to hold two brass rods that are fitted with brass balls at the top. Fit one of the round boards into one end of the secondary and then place the secondary inside the primary. Arrange the primary and secondary so that they will be concentric; that is, have a common center. Then fit the other round board into the other end of the secondary and fasten the uprights to the base. Solder the ends of the secondary to the brass rods and the coil is finished.

Use the hook-up shown in the illustration. If the coil is worked in the dark the effects are better. If one secondary terminal is grounded forked sparks will jump off the other terminal. Preceding numbers of PRACTICAL ELECTRICS on high-frequency may be consulted for other experiments.



The hook-up of the Tesla coil. Here are seen the spark coil whose spark discharge, really a cataract of almost infinitely short duration, gives the high frequency characteristic of the coil. The condensers in parallel with the primary prevent disastrous sparking and arcing and the secondary acted on by the enormous frequency gives the spectacular effects.